

Application No. 10/594,652
Amendment Dated: July 14, 2010
Reply to Office Action Dated April 14, 2010

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (previously presented) A method of fabricating at least one polycrystalline silicon plate with one of its two faces presenting predetermined relief, said method comprising the steps of:

depositing a layer of polycrystalline silicon on at least one of the two faces of a support, said support being a carbon tape;

embossing said face of the support to impart thereto a shape that is complementary to said relief;

depositing said polycrystalline silicon layer on said embossed face of the support, the surface of said polycrystalline silicon layer situated in contact with said embossed face then taking on the shape of said relief;

cutting up said polycrystalline silicon layer; and

eliminating said support in order to obtain said polycrystalline silicon plate.

2. (cancelled)

3. (previously presented) A method according to claim 2, wherein said carbon tape is covered in

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a protective coating of pyrolytic graphite after its surface has been embossed in order to impart thereto said shape complementary to said relief.

4. (previously presented) A method according to claim 1, wherein said face of the support is embossed in order to impart thereto a shape complementary to said relief by being pinched between two rollers and by causing said support to run between the rollers, the embossing surface of at least one of said rollers having the shape of said predetermined relief.

5. (previously presented) A method according to claim 1, wherein said support face is embossed to impart thereto a shape complementary to said relief by embossing a die against said support, the embossing surface of the die having the shape of a plane surface on which said predetermined relief has been embossed.

6. (previously presented) A method according to claim 4, wherein said surface of said roller or of said die is made of a material selected from the group consisting of carbon; silicon carbide; silicon; and silicon nitride.

7. (previously presented) A method according to of claim 4, wherein the embossing surfaces of the two rollers have the shape of said relief, both faces of said support then taking on the shape complementary to said relief during said pinching and running between said rollers.

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8. (previously presented) A method according to claims 3, wherein a polycrystalline silicon layer is deposited simultaneously and continuously on both of the faces of said tape by causing it to pass through a bath of molten silicon and by pulling it vertically upwards at constant speed so as to exit said bath, thereby obtaining two layers of polycrystalline silicon, each having a surface with said relief.

9. (previously presented) A method according to claim 1, wherein said support is eliminated by being burnt off by heating the assembly of the support and the polycrystalline silicon to high temperature.

10. (previously presented) A method according to claim 9, wherein the face of the polycrystalline silicon that has the shape of said relief is cleaned after said support has been burnt off.

11. (previously presented) A method according to claim 1, wherein said support presents a thickness lying in the range 200 μm to 350 μm .

12. (previously presented) A method according to claim 1, wherein the thickness of the polycrystalline silicon layer lies in the range 40 μm to 300 μm .

13. (previously presented) A method according to claim 3, wherein the thickness of said protective coating is substantially equal to 1 μm .

14. (previously presented) A method according to claim 1, wherein said face of said support is embossed in such a manner as to texture said face of said polycrystalline silicon layer, said relief being selected in such a manner as to increase the probability of incident light being absorbed in said layer.

15. (previously presented) A method according to claim 14, wherein said relief in the form of an array of substantially identical pyramids.

16. (previously presented) A method according to claim 15, wherein the side faces of each of said pyramids form angles that are substantially equal to 45° with the base of the pyramid.

17. (previously presented) A method according to claim 15, wherein said pyramids are of a height lying in the range $1\text{ }\mu\text{m}$ to $10\text{ }\mu\text{m}$.

18. (previously presented) A method according to claim 1, wherein said face of said support is embossed in such a manner that said surface of said silicon layer is marked with a pattern resembling said plate or a series of polycrystalline silicon plates.

19. (previously presented) A method according to claim 18, wherein said pattern is a bar code.

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20. (previously presented) A method according to claim 18, wherein said polycrystalline in that said pattern is a number.

21. (previously presented) A method according to claim 14 wherein said relief is formed by the texturing said face of said polycrystalline silicon layer and by said pattern resembling said plate.

22. (previously presented) A method according to claim 1, wherein said grooves are embossed in said face of said support in such a manner that ribs of shape complementary to the grooves are formed on said surface of the silicon layer, thereby increasing the stiffness of said layer.

23. (previously presented) A method according to claim 22, wherein said grooves are of a depth of a few tens of micrometers.

24. (previously presented) A method according to claim 22, wherein the greatest width of said ribs is no more than a few millimeters.

25. (previously presented) A method according to claim 2, wherein said ribs extend in the length direction of said tape.

26. (previously presented) A method according to claim 2, wherein said ribs extend in the width direction of said tape.

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27. (previously presented) A method according to claim 25, wherein said relief is waffle-shaped, having a grid of ribs in the length direction and in the width direction of said tape.

28. (previously presented) A method according to claim 7, wherein each of said rollers is made up of at least two knurling wheels each having a face forming an embossing face, said knurling wheels being separated from one another by disks each having a portion projecting beyond the embossing faces of said knurling wheels, said embossing surfaces of the rollers being formed by said embossing faces of said knurling wheels forming the texturing and/or the marking of said silicon layer, and said projecting portions of said disk forming grooves in the support tape and forming said relief in the shape of ribs on the layers of silicon.

29. (previously presented) A method according to claim 18, wherein each of said rollers is made up of a succession of knurling wheels separated from one another by disks, each of said disks having a portion projecting beyond the surfaces of said knurling wheels to create grooves in the support tape, the spacing between said grooves forming said pattern resembling said plate or said series of polycrystalline silicon plates.

30. (previously presented) A method according to claim 7, wherein each of said rollers is made up of at least two knurling wheels revolving about an axis of rotation, each having a face forming an embossing face, at least one of said knurling wheels including longitudinal ribs parallel to said

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axis of rotation.

31. (previously presented) A method according to claim 11, wherein said support presents a thickness lying in the range of 200 μm to 300 μm .

32. (new) A method of fabricating at least one polycrystalline silicon plate with one of its two faces presenting predetermined relief, said method comprising the steps of:

depositing a layer of polycrystalline silicon on at least one of the two faces of a support, said support being a carbon tape, so that a tape with at least two layers is formed;

embossing said face of the support to impart thereto a shape that is complementary to said relief;

depositing said polycrystalline silicon layer on said embossed face of the support, the surface of said polycrystalline silicon layer situated in contact with said embossed face then taking on the shape of said relief;

cutting up said polycrystalline silicon layer; and

eliminating said support in order to obtain said polycrystalline silicon plate.

33. (new) A method of fabricating at least one polycrystalline silicon plate with one of its two faces presenting predetermined relief, said method comprising the steps of:

depositing a layer of polycrystalline silicon on at least one of the two faces of a support, said support being a carbon tape;

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embossing said face of the support to impart thereto a shape that is complementary to said relief;

covering said support by a protective coating of pyrolytic graphite after its surface has been embossed in order to impart thereto said shape complementary to said relief;

depositing said polycrystalline silicon layer on said embossed face of the support, the surface of said polycrystalline silicon layer situated in contact with said embossed face then taking on the shape of said relief;

cutting up said polycrystalline silicon layer; and

eliminating said support and said protective coating in order to obtain said polycrystalline silicon plate.